List of Claims:

1. (previously presented) A method for removing DTMF signals from audio signals comprising the steps of:

examining audio signals for potential DTMF signals;

preparing the audio signals for transmission as digital packets;

while no potential DTMF signals have been detected, promptly transmitting a digital packet after sufficient time has elapsed for a potential DTMF signal to be detected in said digital packet; and

if a potential DTMF signal is detected, storing the digital packets and stalling transmission of stored digital packets until DTMF detection can be performed, and if the potential DTMF signal does not result in a DTMF detection, promptly transmitting the stored digital packets, and if the potential DTMF signal does result in a DTMF detection, discarding the stored digital packets and transmitting a control packet containing information relating to characteristics of a DTMF signal that was detected.

2. (previously presented) The method according to claim 1, wherein:

the step of preparing the audio signals for transmission as the digital packets comprises preparing the audio signals for transmission as RTP packets.

3. (original) The method according to claim 1, wherein:

the step of transmitting said digital packet includes transmitting the digital packets over an IP network.

4. (original) The method according to claim 2, further comprising the step of:

transmitting the RTP packets over an IP network.

5. (original) The method according to claim 1, wherein:

the audio signals include digitized representations of voice signals.

6. (original) The method according to claim 2, wherein:

the audio signals include digitized representations of voice signals.

7. (original) The method according to claim 3, wherein:

the audio signals include digitized representations of voice signals.

8. (original) The method according to claim 5, wherein:

the step of examining the audio signals for potential DTMF signals is performed using digital signal processing.

9. (original) The method according to claim 6, wherein:

the step of examining the audio signals for potential DTMF signals is performed using digital signal processing.

10. (original) The method according to claim 7, wherein:

the step of examining the audio signals for potential DTMF signals is performed using digital signal processing.

11. (original) The method according to claim 2, further comprising the step of:

when the potential DTMF signal does result in a DTMF detection, preparing a control packet comprising 32 bits of information having a format of:

RRRNNNNNRRVVVVVVDDDDDDDDDDDDDDDD

where "R" designates reserved bits;

"N" designates bits of data representative of a DTMF digit;

"V" designates bits of data representing the power level of the DTMF signal, expressed in dBm0 after dropping the sign; and,

"D" designates bits of data indicating a duration for a DTMF signal, in timestamp units.

12. (original) The method according to claim 11, wherein:

the "N" bits of data representative of a DTMF digit are encoded so that the following encoded data represents the indicated DTMF digit:

an encoded "0" represents a DTMF digit of 0

an encoded "1" represents a DTMF digit of 1

an encoded "2" represents a DTMF digit of 2

an encoded "3" represents a DTMF digit of 3

an encoded "4" represents a DTMF digit of 4

an encoded "5" represents a DTMF digit of 5

an encoded "6" represents a DTMF digit of 6

an encoded "7" represents a DTMF digit of 7

an encoded "8" represents a DTMF digit of 8

an encoded "9" represents a DTMF digit of 9

an encoded "10" represents a DTMF digit of *

an encoded "11" represents a DTMF digit of #

an encoded "12" represents a DTMF digit of A

an encoded "13" represents a DTMF digit of B

an encoded "14" represents a DTMF digit of C

an encoded "15" represents a DTMF digit of D.

13. (original) The method according to claim 12, wherein:

the "N" bits of data representative of a DTMF digit are encoded so that the following encoded data represents the indicated DTMF digit:

an encoded "16" represents a Flash.

14. (original) The method according to claim 11, wherein:

the reserve bits are set to zero.

15. (original) The method according to claim 12, wherein:

the reserve bits are set to zero.

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16. (original) The method according to claim 13, wherein:

the reserve bits are set to zero.

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17. (previously presented) A method for transmitting audio signals potentially including voice signals and DTMF signals over an IP network, comprising the steps of:

processing digital representations of audio signals to detect potential DTMF signals;

in a first mode of operation while no potential DTMF signal has been detected (a) preparing the digital representations of audio signals for transmission as RTP packets; and (b) transmitting an RTP packet over an IP network after a predetermined period of time sufficient to allow the step of processing digital representations of audio signals to detect potential DTMF signals to be completed for said RTP packet;

in a second mode of operation when a potential DTMF signal has been detected, preparing the digital representations of audio signals for potential transmission as RTP packets, storing the RTP packets and stalling transmission of stored RTP packets while the potential DTMF signal is processed to verify whether it is a valid DTMF signal;

(a) if the potential DTMF signal is determined to not be a valid DTMF signal, transmitting the stored RTP packets over an IP network; and,

(b) if the potential DTMF signal is determined to be a valid DTMF signal; discarding the stored RTP packets, preparing an RTP control packet containing information indicative of characteristics of a DTMF signal, and transmitting the control packet over an IP network.

18. (original) The method according to claim 17, further comprising the steps of:

receiving the RTP packets at a remote location coupled to an IP network; decoding the RTP packets to recover digital representations of audio signals;

converting digital representations of audio signals to analog signals;

receiving an RTP control packet at a remote location coupled to the IP network; and,

generating DTMF signals having characteristics determined by information contained in the RTP control packets.

19. (previously presented) An apparatus for removing DTMF signals from audio signals to be transmitted over an IP network, comprising:

a telephony interface;

a digital processor coupled to the telephony interface for processing digital representations of audio signals to detect potential DTMF signals;

a microcontroller coupled to the digital processor, the microcontroller being operative to prepare the digital representations of audio signals for transmission as RTP packets;

memory coupled to the microcontroller for temporarily storing RTP packets;

a control register coupled to the digital processor and readable by the microcontroller, the control register including a flag bit indicative of the status of detection of a potential DTMF signal, the control register including one or more flag bits indicative of the detection of a valid DTMF signal;

a network interface coupled to the microcontroller for coupling RTP packets to an IP network; and

wherein when the flag bit indicative of the status of detection of a potential DTMF signal is not set, the RTP packets are promptly coupled to the network interface for transmission over the IP network, and when the flag bit indicative of the status of detection of a potential DTMF signal is set, the RTP packets are stored in the memory and transmission o stored RTP packets are stalled while the digital processor performs additional DTMF

detection processing, and if the flag bit indicative of the status of detection of a potential DTMF signal is reset and a flag bit indicative of the detection of a valid DTMF signal is not set, the stored RTP packets are promptly coupled to the network interface for transmission over the IP network, and if a flag bit indicative of the detection of a valid DTMF signal is set, the stored RTP packets are discarded and a control packet is prepared by the microcontroller where the control packet contains information indicative of characteristics of a DTMF signal and the control packet is coupled to the network interface for transmission over the IP network.

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20. (original) The apparatus according to claim 19, further comprising:

a second network interface coupled to the IP network at a remote location;

a second microcontroller coupled to the second network interface;

a digital-to-analog converter coupled to the second microcontroller for converting digital representations of audio signals to analog signals; and,

a DTMF signal generator coupled to the second microcontroller for generating DTMF signals having characteristics determined by information contained in a control packet.

21. (original) The apparatus according to claim 19, further comprising:

a second network interface coupled to the IP network at a remote location;

a second microcontroller coupled to the second network interface;

a digital-to-analog converter coupled to the second microcontroller for converting digital representations of audio signals to analog signals; and,

a second digital processor operative to generate DTMF signals having characteristics determined by information contained in a control packet.

22. (currently amended) A communication method for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication method comprising:

sampling ~~a portion of~~ said audio signal to generate a plurality of samples;

digitizing said plurality of samples to generate a plurality of digitized samples;

detecting an energy indicative of said first frequency tone in said ~~portion~~ audio signal;

stalling said transmission of said digitized samples in response to said detecting;

confirming said ~~portion~~ audio signal includes said DTMF signal; and

generating a packet indicative of said DTMF signal, discarding said digitized samples and transmitting said packet, in response to said confirming.

23. (previously presented) The communication method of claim 22, wherein said first frequency is a high frequency and said second frequency is a low frequency.

24. (previously presented) The communication method of claim 22, wherein said detecting uses a wideband energy detector.

25. (previously presented) The communication method of claim 22, wherein said detecting compares said energy with a high threshold and a low threshold.

26. (currently amended) The communication method of claim 22, wherein said confirming confirms an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

27. (previously presented) The communication method of claim 22, wherein said confirming confirms a frequency tolerance of each said tone.

28. (previously presented) The communication method of claim 22, wherein said confirming confirms a frequency deviation of each said tone.

29. (currently amended) The communication method of claim 22, wherein said confirming confirms a twist in said ~~portion~~ audio signal.

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30. (currently amended) A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

a sampler capable of sampling ~~a portion of~~ said audio signal to generate a plurality of samples;

a digitizer capable of digitizing said plurality of samples to generate a plurality of digitized samples;

a detector capable of detecting an energy indicative of said first frequency tone in said ~~portion~~ audio signal; and

a processor capable of stalling said transmission of said digitized samples in response to said detector and confirming said ~~portion~~ audio signal includes said DTMF signal;

wherein said processor is further capable of generating a packet indicative of said DTMF signal, discarding said digitized samples and transmitting said packet, in response to said confirming.

31. (previously presented) The communication device of claim 30, wherein said first frequency is a high frequency and said second frequency is a low frequency.

32. (previously presented) The communication device of claim 30, wherein said detector is a wideband energy detector.

33. (previously presented) The communication device of claim 30, wherein said detector compares said energy with a high threshold and a low threshold.

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34. (currently amended) The communication device of claim 30, wherein said processor confirms an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

35. (previously presented) The communication device of claim 30, wherein said processor confirms a frequency tolerance of each said tone.

36. (previously presented) The communication device of claim 30, wherein said processor confirms a frequency deviation of each said tone.

37. (currently amended) The communication device of claim 30, wherein said processor confirms a twist in said ~~portion~~ audio signal.

38. (currently amended) A communication method for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication method comprising:

analyzing ~~a portion of~~ said audio signal to detect an element indicative of said DTMF;

stalling said transmission of said ~~portion~~ audio signal if said analyzing detects said element, else continuing said transmission of said ~~portion~~ audio signal;

processing said ~~portion~~ audio signal, in response to said stalling, to confirm said ~~portion~~ audio signal includes said DTMF signal; and

discarding said ~~portion~~ audio signal, generating a packet indicative of said DTMF signal and transmitting said packet if said processing confirms said ~~portion~~ audio signal includes said DTMF signal, else continuing said transmission of said ~~portion~~ audio signal.

39. (previously presented) The communication method of claim 38, wherein said element is an energy of said first frequency.

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40. (previously presented) The communication method of claim 39, wherein said first frequency is a high frequency and said second frequency is a low frequency.

41. (previously presented) The communication method of claim 39, wherein said analyzing uses a wideband energy detector.

42. (previously presented) The communication method of claim 41, wherein said analyzing compares said energy with a high threshold and a low threshold.

43. (currently amended) The communication method of claim 38, wherein said processing is capable of confirming an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

44. (previously presented) The communication method of claim 38, wherein said processing is capable of confirming a frequency tolerance of each said tone.

45. (previously presented) The communication method of claim 38, wherein said processing is capable of confirming a frequency deviation of each said tone.

46. (currently amended) The communication method of claim 38, wherein said processing is capable of confirming a twist in said ~~portion~~ audio signal.

47. (currently amended) A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

a processor capable of analyzing ~~a portion of~~ said audio signal to detect an element indicative of said DTMF, wherein said processor stalls said transmission of said ~~portion~~ audio signal if said processor detects said element, else said processor continues said transmission of said ~~portion~~ audio signal;

wherein said processor processes said ~~portion~~ audio signal, in response to said stalling, to confirm said ~~portion~~ audio signal includes said DTMF signal, and wherein said processor discards said ~~portion~~ audio signal, generates a packet indicative of said DTMF signal and transmits said packet if said processor confirms said ~~portion~~ audio signal includes said DTMF signal, else said processor continues said transmission of said ~~portion~~ audio signal.

48. (previously presented) The communication device of claim 47, wherein said element is an energy of said first frequency.

49. (previously presented) The communication device of claim 48, wherein said first frequency is a high frequency and said second frequency is a low frequency.

50. (currently amended) The communication device of claim 48, wherein said processor uses a wideband energy detector for analyzing said ~~portion~~ audio signal.

51. (currently amended) The communication device of claim 50, wherein said processor compares said energy with a high threshold and a low threshold for analyzing said ~~portion~~ audio signal.

52. (currently amended) The communication device of claim 47, wherein said processor is capable of confirming an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

53. (previously presented) The communication device of claim 47, wherein said processor is capable of confirming a frequency tolerance of each said tone.

54. (previously presented) The communication device of claim 47, wherein said processor is capable of confirming a frequency deviation of each said tone.

55. (currently amended) The communication device of claim 47, wherein said processor is capable of confirming a twist in said ~~portion~~ audio signal.

56. (currently amended) A communication method for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication method comprising:

detecting an element indicative of said DTMF;

stalling said transmission of said ~~portion~~ audio signal, in response to said detecting;

confirming said ~~portion~~ audio signal includes said DTMF signal; and

discarding said ~~portion~~ audio signal, generating a packet indicative of said DTMF signal and transmitting said packet, in response to said confirming.

57. (previously presented) The communication method of claim 56, wherein said element is an energy of said first frequency.

58. (previously presented) The communication method of claim 57, wherein said detecting uses a wideband energy detector.

59. (previously presented) The communication method of claim 58, wherein said detecting compares said energy with a high threshold and a low threshold.

60. (previously presented) The communication method of claim 56, wherein said first frequency is a high frequency and said second frequency is a low frequency.

61. (currently amended) The communication method of claim 56, wherein said confirming confirms an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

62. (previously presented) The communication method of claim 56, wherein said confirming confirms a frequency tolerance of each said tone.

63. (previously presented) The communication method of claim 56, wherein said confirming confirms a frequency deviation of each said tone.

64. (currently amended) The communication method of claim 56, wherein said confirming confirms a twist in said ~~portion~~ audio signal.

65. (currently amended) A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

means for detecting an element indicative of said DTMF;

means for stalling said transmission of said ~~portion~~ audio signal for use in response to said means for detecting;

means for confirming said ~~portion~~ audio signal includes said DTMF signal; and

means for discarding said ~~portion~~ audio signal, means for generating a packet indicative of said DTMF signal and means for transmitting said packet for use if said means for confirming confirms said ~~portion~~ audio signal includes said DTMF signal.

66. (previously presented) The communication device of claim 65, wherein said element is an energy of said first frequency.

67. (previously presented) The communication device of claim 66, wherein said means for detecting uses a wideband energy detector.

68. (previously presented) The communication device of claim 67, wherein said means for detecting compares said energy with a high threshold and a low threshold.

69. (currently amended) The communication device of claim 65, wherein said means for confirming confirms an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

70. (currently amended) A computer software product for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said computer software product comprising:

code for detecting an element indicative of said DTMF;

code for stalling said transmission of said ~~portion~~ audio signal for execution in response to said code for detecting;

code for confirming said ~~portion~~ audio signal includes said DTMF signal; and

code for discarding said ~~portion~~ audio signal, code for generating a packet indicative of said DTMF signal and code for transmitting said packet for execution in response to said code for confirming.

71. (previously presented) The computer software product of claim 70, wherein said element is an energy of said first frequency.

72. (previously presented) The computer software product of claim 71, wherein said first frequency is a high frequency and said second frequency is a low frequency.

73. (previously presented) The computer software product of claim 71, wherein said code for detecting uses a wideband energy detector.

74. (previously presented) The computer software product of claim 73, wherein said code for detecting compares said energy with a high threshold and a low threshold.

75. (currently amended) The computer software product of claim 70, wherein said code for confirming confirms an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.

76. (currently amended) A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

a detector capable of detecting an element indicative of said DTMF; and

a processor capable of stalling said transmission of said ~~portion~~ audio signal, in response to said detector detecting said element indicative of said DTMF, confirming said ~~portion~~ audio signal includes said DTMF signal, discarding said ~~portion~~ audio signal, generating a packet indicative of said DTMF signal and transmitting said packet.

77. (previously presented) The communication device of claim 76, wherein said element is an energy of said first frequency.

78. (previously presented) The communication device of claim 77, wherein said first frequency is a high frequency and said second frequency is a low frequency.

79. (previously presented) The communication device of claim 77, wherein said detector uses a wideband energy detector.

80. (previously presented) The communication device of claim 79, wherein said detector compares said energy with a high threshold and a low threshold.

81. (currently amended) The communication device of claim 76, wherein said processor confirms an existence of said first frequency and said second frequency in said ~~portion~~ audio signal.